DETAILED ACTION

Claim Objections

1. Claims 4-6 and 10-16 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, claims 4-6 and 10-16 have not been further treated on the merits.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims **1-3 and 7-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. in US 5,126,513 (hereinafter Wang) in view of Olson in US 4,787,051 and Yamada in US 5,874,941.

4. Regarding **claim 1**, Wang teaches a method for remote control of an apparatus (Wang, display screen 15 of Fig. 1), using a control device carried by the user (Wang, transmitter 10 of Fig. 1) and comprising steps of:

- a control device (Wang, transmitter 10 of Fig. 1) transmits radio-electric signals (Wang, semicircles of Fig. 1 and electromagnetic signals col. 6 lines 16-21) to a processing device (Wang, elements 11-14 of Fig. 1) connected to the apparatus to be controlled (Wang, display screen 15 of Fig. 1), and

the processing device:

- receives radio-electric signals (Wang, semicircles of Fig. 1) through at least first and second antennas (Wang, receivers 11 and 12 of Fig. 1) spaced out along an axis (Wang, vertical axis of Fig. 1);

- demodulates (Wang, phase measurement of col. 6 lines 24-31) in synchronous manner (Wang, two similar phase points on the signals received are counted by the phase detector in col. 6 lines 24-31, therefore teaching the two signals being counted synchronously) with a reference signal (Wang, reference clock of col. 6 lines 24-31), the radio-electric signals received by the first and second antennas respectively (Wang, col. 6 lines 24-31 referring to signals received from first and second receivers 11 and 12 of Fig. 1), and

-determines the commands (Wang, displacement 19 of cursor 16 of Fig. 1) to be applied to the apparatus to be controlled (Wang, display screen 15 of Fig. 1), the commands comprising displacement information along the axis (Wang, vertical axis of Fig. 1), determined as a function of demodulated signals (Wang, phase difference 13 of Fig. 1).

Wang does not teach the processing device receiving movement measurements from the control device through first and second antennas spaced out along a second axis non parallel to a first axis, and the movement measurements to be along the first axis.

However, Olson teaches a method for a remote control apparatus (Olson, Col. 2 lines 38-47) comprising the steps of:

- measuring movements (Olson, acceleration of col. 9 lines 21-23) of the control device along at least a first axis (Olson, X, Y or Z of col. 9 lines 23-25);

- determining commands to be applied (Olson, movement of the cursor of col. 10 lines 48-53) to the apparatus to be controlled (Olson, 3D display of col. 10 lines 48-53) as a function of the movement measurements of the control device (Olson, acceleration of device shown in Fig. 5), and

- applying the commands to the apparatus to be controlled (Olson, movement of the cursor in the 3D display of col. 10 lines 48-53).

Olson, further teaches the commands to be transmitted to a remote computer via an infrared transmitter and receiver (Olson, col. 9 lins 61 to col. 10 line 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to add an accelerometer (as taught by Olson) in Wang's control device in order to obtain the predictable result of enabling an operator to directly control the position of a cursor in a three-dimensional display (as taught by Olson in col. 10 lines 48-53). Furthermore, by adding an accelerometer for the purpose of measuring translation in the z direction (as taught by Olson), it would be have been obvious to one of ordinary skill in the art, to re-use the antennas in Wang's device (receivers 11 and 12 of Wang's Fig. 1) to receive the infrared signals from the accelerometer, and therefore, enable processing of the acceleration data.

By adding an accelerometer to measure movement in the z-axis, Wang in view of Olson, effectively teach the antennas to receive movement measurement (translation in the z-axis by the added accelerometer) and radio electric signals (from the transmitter

10 in Wang's Fig. 1) where the antennas are in a second axis (vertical axis of Wang's Fig. 1, which, for example, is the XY plane) non-parallel from the first axis (z-axis, where the added accelerometer is measuring translation).

However, neither Olson nor Wang teach a control activation information as a function of movement measurements. Nevertheless, Yamada teaches an input device based on accelerometers (Yamada, Figs. 1A-B) where a threshold (Yamada, Fig. 1B, threshold 13) is used to compare against the accelerometer’s output (as shown in Yamada’s Fig. 1B) to provide control activation information (activating the phase switch circuit 16 by the signal P from the threshold circuit 13 in Yamada’s Fig. 1, which in turns selects a signal that indicates the inclination direction per col. 5 line 61 to col. 6 line 28).

Thus, it would also have been obvious to one of ordinary skill in the art to use an accelerometer threshold (as taught by Yamada) in Wang’s in view of Olson method and device in order to obtain the added benefit of not having to largely wave the hand even when the lecturer requires a large cursor movement (as taught by Yamada in col. 6 lines 29-32).

Regarding **claim 7**, Wang teaches a control system (Fig. 1) for remote control of an apparatus (Wang, display screen 15 of Fig. 1), comprising a control device carried by the user (Wang, transmitter 10 of Fig. 1) and communicating with the apparatus to be controlled (as shown in Wang’s Fig. 1, the transmitter 10 communicates with the display 15 through the semicircle signals), the control device emitting radio-electric signals (Wang, semicircles of Fig. 1 and electromagnetic signals col. 6 lines 16-21), the system

further comprising a processing device (Wang, elements 11-14 of Fig. 1) connected to the apparatus to be controlled (Wang, display screen 15 of Fig. 1), and to at least first and second antennas (Wang, receivers 11 and 12 of Fig. 1) spaced out along an axis (Wang, vertical axis of Fig. 1), and receiving the radio-electric signals emitted by the control device (as shown in Wang's Fig. 1 by semicircles),

the processing device comprises:

- means for demodulating (Wang, phase measurement of col. 6 lines 24-31) in synchronous manner (Wang, two similar phase points on the signals received are counted by the phase detector in col. 6 lines 24-31, therefore teaching the two signals being counted synchronously) with a reference signal (Wang, reference clock of col. 6 lines 24-31), the radio-electric signals received from the control device (Wang, Fig. 1 semicircles) respectively through the intermediary of the first and second antennas (Wang, col. 6 lines 24-31 referring to signals received from first and second receivers 11 and 12 of Fig. 1, on which phase difference is measured by phase detector 13),

-means for defining the displacement information along the axis (vertical axis of Wang's Fig. 1) as a function of the measured phase shifts (Wang, col. 6 lines 24-31);

-means for defining commands (Wang, displacement 19 of cursor 16 of Fig. 1) to be applied to the apparatus to be controlled (Wang, display screen 15 of Fig. 1 from displacement information (Wang. Col. 6, lines 31-34).

Wang does not teach the processing device receiving movement measurements from the control device through first and second antennas spaced out along a second

axis non parallel to a first axis, and the movement measurements to be along the first axis.

However, Olson teaches a control system for remote control of an apparatus (Olson, Col. 2 lines 38-47) comprising means for measuring movements (Olson, accelerometers measuring acceleration of col. 9 lines 21-23) of the control device along at least a first axis (Olson, X, Y or Z of col. 9 lines 23-25), wherein commands to be applied (Olson, movement of the cursor of col. 10 lines 48-53) to the apparatus to be controlled (Olson, 3D display of col. 10 lines 48-53) are defined as a function of the movement measurements of the control device (Olson, acceleration of device shown in Fig. 5), and applying the commands to the apparatus to be controlled (Olson, movement of the cursor in the 3D display of col. 10 lines 48-53).

Olson, also teaches the commands to be transmitted to a remote computer via an infrared transmitter and receiver (Olson, col. 9 lins 61 to col. 10 line 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to add an accelerometer (as taught by Olson) in Wang's control device in order to obtain the predictable result of enabling an operator to directly control the position of a cursor in a three-dimensional display (as taught by Olson in col. 10 lines 48-53). Furthermore, by adding an accelerometer for the purpose of measuring translation in the z direction (as taught by Olson), it would have been obvious to one of ordinary skill in the art at the time of the invention, to re-use the antennas in Wang's device (receivers 11 and 12 of Wang's Fig. 1) to receive the infrared signals from the accelerometer, and therefore, enable processing of the acceleration data.

By adding an accelerometer to measure movement in the z-axis, Wang in view of Olson, effectively teach the antennas to receive movement measurement (translation in the z-axis by the added accelerometer) and radio electric signals (from the transmitter 10 in Wang's Fig. 1) where the antennas are in a second axis (vertical axis of Wang's Fig. 1, which, for example, is the XY plane) non-parallel from the first axis (z-axis, where the added accelerometer is measuring translation).

However, neither Olson nor Wang teach a control activation information as a function of movement measurements. Nevertheless, Yamada teaches an input device based on accelerometers (Yamada, Figs. 1A-B) where a threshold (Yamada, Fig. 1B, threshold 13) is used to compare against output of the accelerometer (as shown in Yamada's Fig. 1B) to provide control activation information (activating the phase switch circuit 16 by the signal P from the threshold circuit 13 in Yamada's Fig. 1, which in turns selects a signal that indicates the inclination direction per col. 5 line 61 to col. 6 line 28).

Thus, it would have been obvious to one of ordinary skill in the art to use an accelerometer threshold (as taught by Yamada) in Wang's in view of Olson control system in order to obtain the added benefit of not having to largely wave the hand even when the lecturer requires a large cursor movement (as taught by Yamada in col. 6 lines 29-32).

5. Regarding **claims 2 and 8**, Wang in view of Olson and Yamada teach the movement measurement along the first axis (z-axis), carried out by the control device (transmitter 10 of Wang's Fig. 1 with added accelerator as taught by Olson and

explained for claim 1) are measurements of acceleration (by the added accelerator as taught by Olson and explained for claim 1) along the first axis (z-axis as explained for claim 1), the processing device (Wang, elements 11-14 of Fig. 1; with the added acceleration threshold as explained for claim 1) determining the control activation information (inclination direction of threshold circuit 13 and phase switch circuit 16 of Yamada's Fig. 1 as explained for claim 1) by comparing the measured acceleration with at least one predefined threshold (Yamada's Fig. 1).

6. Regarding **claims 3 and 9**, Wang in view of Olson and Yamada teach the processing device (Wang, elements 11-14 of Fig. 1) receiving the radio-electric signals emitted by the control device (transmitter 10 of Wang's Fig. 1) through at least a third antenna (Wang's Fig. 2, antennas 21 and 22), separated from the first and second antennas (Wang's Fig. 2, antennas 11 and 12), along a third axis (semi horizontal axis of antennas 21 and 22 of Wang's Fig. 2) non-parallel to the first and second axes (as shown in Wang's Fig. 2) and determines information about the control device (transmitter 10 of Wang's Fig. 1) displacement along the third axis (semi horizontal axis of antennas 21 and 22 of Wang's Fig. 2), by measuring phase shifts (with phase detector 23 as shown in Wang's Fig. 2 and col. 6 lines 47-49) between the reference signal (Wang, reference clock of col. 6 lines 24-31) and the radio-electric signals (semicircles of Wang's Fig. 2) received by the processing device (Wang, elements 11-14 of Fig. 1) through the third antenna (Wang's Fig. 2, antennas 21 and 22).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Zimmerman et al. in US 4,988,981, Howard in US 6,097,374 and Baron et al. in US 5,977,958 teach input devices for transmitting gesture and hand position signals to a computer for manipulation of a cursor on a display.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LILIANA CERULLO whose telephone number is (571)270-5882. The examiner can normally be reached on Monday to Thursday 8AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on 571-272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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